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Development of the Nuclear Weapons Complex EP Architecture

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Development of the Nuclear Weapons Complex EP Architecture

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Abstract

The Nuclear Weapons Guidance Team is an interagency committee led by Earl Whiteman, DOE that chartered the generation of EP40100, Concurrent Qualification and its successor EP 401099, Concurrent Engineering and Qualification. As this new philosophy of concurrent operations has evolved and as implementation has been initiated, conflicts and insufficiencies in the remaining Engineering Procedures (EPs) have become more apparent.

At the Guidance Team meeting in November, 1995, this issue was explored and several approaches were considered. It was concluded at this meeting, that a smaller set of interagency EPs described in a hierarchical system could provide the necessary interagency direction to support complex-wide implementation. This set consolidates many existing EP processes where consistency and commonality are critical to success of the extended enterprise.

The Guidance Team subsequently chartered an interagency team to initiate development activity associated with the envisioned new EP set. This team had participation from seven Nuclear Weapons Complex (NWC) sites as well as DOE/AL and DP-14 (team members are acknowledged later in this report.)

Per the Guidance Team, this team, referred to as the Architecture Subcommittee, was to map out and define an EP Architecture for the interagency EPs, make recommendations regarding a more agile process for EP approval and suggest an aggressive timeline to develop the combined EPs.

The Architecture Subcommittee was asked to brief their output at the February Guidance Team meeting. This SAND report documents the results of the Architecture Subcommittee's recommendations.

Introduction

The EP Architecture Committee met from January 23-25 to complete the following objectives:

- to develop and define an EP Architecture and document hierarchy for the Nuclear Weapons Complex (NWC);
- to develop a timeline and plan for managing the transition to the new architecture; and
- to propose a streamlined EP approval process.

The architecture developed by the team consisted of a three-tiered hierarchy to the EP system. Guidance such as government regulations and DOE Orders would be translated into Tier 1 EPs. These Tier 1 EPs would facilitate NWC business functions and complex-wide policy. Tier 2 EPs would implement those functions and policies. Finally, Tier 3 EPs would provide site-specific direction. Four Tier 1 EPs were identified for the following subjects:

- the Product Realization Process,
- Nuclear Weapon Safety,
- Configuration Management, and
- Enterprise Communications.

Eighteen Tier 2 EPs were categorized under these Tier 1 EP subjects. Definitions for the Tier 2 EPs were developed and existing EPs that were applicable to the new Tier 2 subjects were identified. A sanity check was performed to assure that *all relevant* information in existing EPs would be included in the new architecture.

A timeline was then developed for the completion of the new EP Architecture. Completion of all Tier 1 and Tier 2 documents for the new architecture is scheduled for September, 30, 1997.

Finally, the team developed an EP approval process that encompassed the development, review, approval, and release of both routine and atypical EPs. It is expected that this new process will accelerate the approval cycle time.

The EP Architecture Committee members are given below.

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Nuclear Weapons Complex Guidance Team Vision

Harry Saxton, representing the NWC Guidance Team, presented their vision of what the EP Architecture Committee should accomplish in the meeting, and what the EP Architecture itself should achieve.

He said the Committee's output should:

- serve as the WBS and schedule for the DOE/AL activity to re-engineer the EPs;
- promote rapid coordination and acceptance of future EPs; and
- shape and influence the business operation at each site and how they function in the NWC system.

The Architecture itself should define a condensed set of processes that should be controlled at the interagency level. These processes should:

- drive NWC change,
- facilitate implementation of concurrent engineering and qualification, and
- allow the NWC to respond with speed and agility.

EP Architecture Definition

After Harry's comments, Chip Evans presented the current vision of what the EP Architecture should be. The vision consisted of a three tiered hierarchy to the EP system. Guidance such as government regulations and DOE Orders would be translated into Tier 1 EPs. These Tier 1 EPs would facilitate NWC business functions and complex-wide policy. Tier 2 EPs would implement those functions and policies. Finally, Tier 3 EPs would provide site-specific direction.

The team then developed specific definitions for each tier in the new architecture. These definitions are as follows.

Tier 1 Document Definition: Tier 1 documents take guidance documents and translate them into implementable NWC policy. Guidance documents include DOE requirements or best practices. For example, EP401099 translates the fuzzy concept of concurrent engineering into an implementable NWC policy.

Tier 2 Document Definition: Tier 2 documents are interagency processes of the Product Realization Process. They supplement Tier 1 documents and implement the minimum set of interface requirements. For example, a Tier 2 document may describe the NWC engineering release system. As another example, EP401099 calls out conceptual design. A Tier 2 document might explain how you would perform conceptual design on an interagency level.

Tier 3 Document Definition: Tier 3 documents are site-specific implementations of Tier 2 documents. Tier 3 documents do not require NWC coordination. An example of a Tier 3 document system would be FM&T's (formally KCD) site specific business practices. The Architecture Committee would not identify or develop these documents.

After defining the hierarchy, the committee then brainstormed potential subject areas for Tier 2 documents. After the brainstorming exercise, the team then affinitized the subject areas into a two-tiered structure. The top tier became a strawman for Tier 1 documents and the bottom tier became a strawman for Tier 2 documents. There were several Tier 2 subjects under the Tier 1 subject of Product Realization (EP401099). Therefore a "phantom level" was developed to further group these Tier 2 subjects. The "phantom level" would not require an EP but would simply facilitate the organization of the hierarchy. The strawman architecture is given in Figure 1.

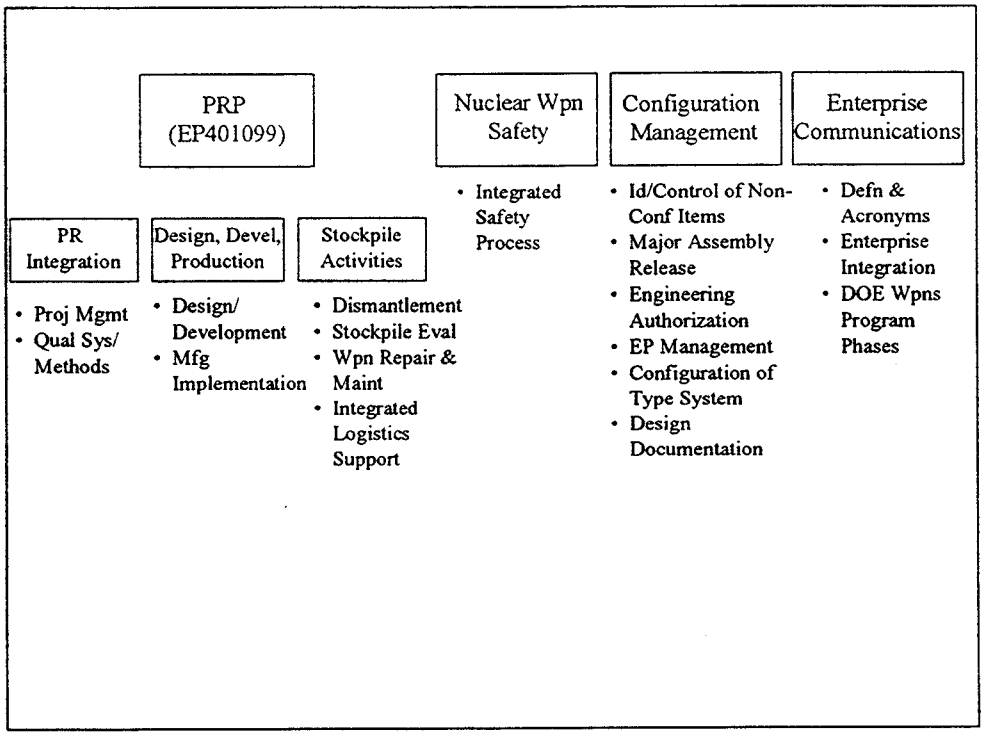

Figure 1. Strawman for EP Architecture

The team then divided into smaller groups and developed definitions for all Tier 2 subject areas. Each group presented their final definitions to the entire committee and revised the definitions based on team comments. Each definition contained:

- the Tier 2 subject area,
- a brief definition of the subject area (25 words or less),
- existing EPs relevant to the subject area,
- the beginning activity for that subject area,
- the ending activity for that subject area,
- what the subject area includes, and
- what the subject area doesn't include.

These definitions are given in Attachment 1.

The committee then compared the current list of EPs to the EPs identified as relevant to the Tier 2 subject areas to make sure that no relevant EPs were inadvertently omitted. Attachment 2 provides:

- a list of the current EPs,
- whether they were relevant to a subject area,
- what subject they were relevant to,
- what EPs are candidates for elimination, and
- what EPs are candidates for Tier 3 documents.

The strawman architecture was now complete.

Timeline Development

Next, the committee determined that a Product Realization Team (PRT) would be the best vehicle to develop the architecture and the new EPs. The committee established a timeline for the PRT to re-engineer the current EP system into this new architecture. The timeline is given in Figure 2.

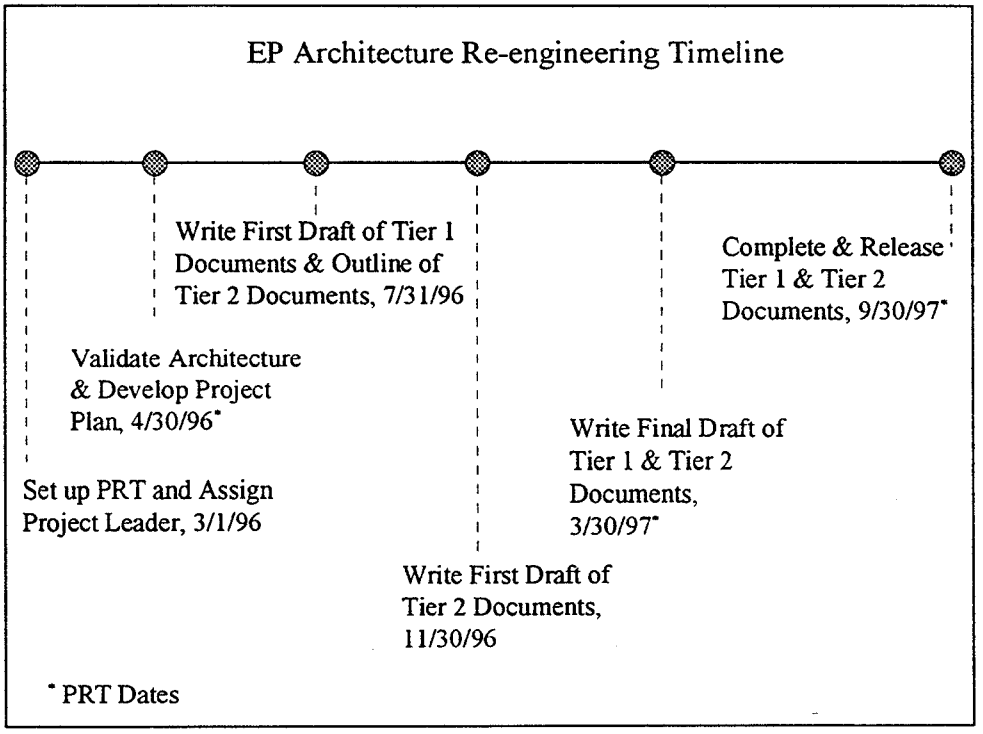

Figure 2. EP Architecture Re-engineering Timeline

In addition, the committee identified the general resources required to re-engineer the EP system. These resources are as follows.

- A PRT Leader with the following characteristics:
  - having project management skills,
  - full time for 1.5 years,
  - believer in the PRT process,
  - knowledgeable in the current EP system,
  - having a large "sphere of influence," and
  - knowledgeable in the PRP.
- A task team to assure approval of the new system with the following characteristics:
  - high level managers (Guidance Team level), and
  - complete site representation.
- A PRT membership with the following characteristics:
  - site representatives, possibly two from each site, totaling approximately 1 FTE over the life of the project,
  - engineering and/or subject matter experts on an as needed basis, and
  - technical writers, totaling approximately 1.5 FTEs over the life of the project.

The following further guidance was developed for the PRT.

- Perform a formal review of existing EPs for each subject area to determine:
    - if it should be eliminated,
    - if it is a Tier 3 subject, and
    - if it is applicable to the subject area.
- Coordinate this review with any overlapping subject areas.
- Incorporate relevant parts of the EPs into a Tier 2 document.
- Make any necessary changes.
- Put in standard EP format.
- Assure the Tier 1 and Tier 2 documents adhere to the definitions given to each level of the hierarchy.
- Concentrate on an 80% solution.
- Coordinate the EPs through the approval process.

This guidance would be communicated to the PRT leader and the team.

Development of the EP Approval Process

The final objective of the group was to define a flexible EP approval process. A flow chart of this process is given in Figure 3. This process encompasses the development, review, approval, and release of both routine and atypical EPs. The process also identifies individuals responsible for completing each task.

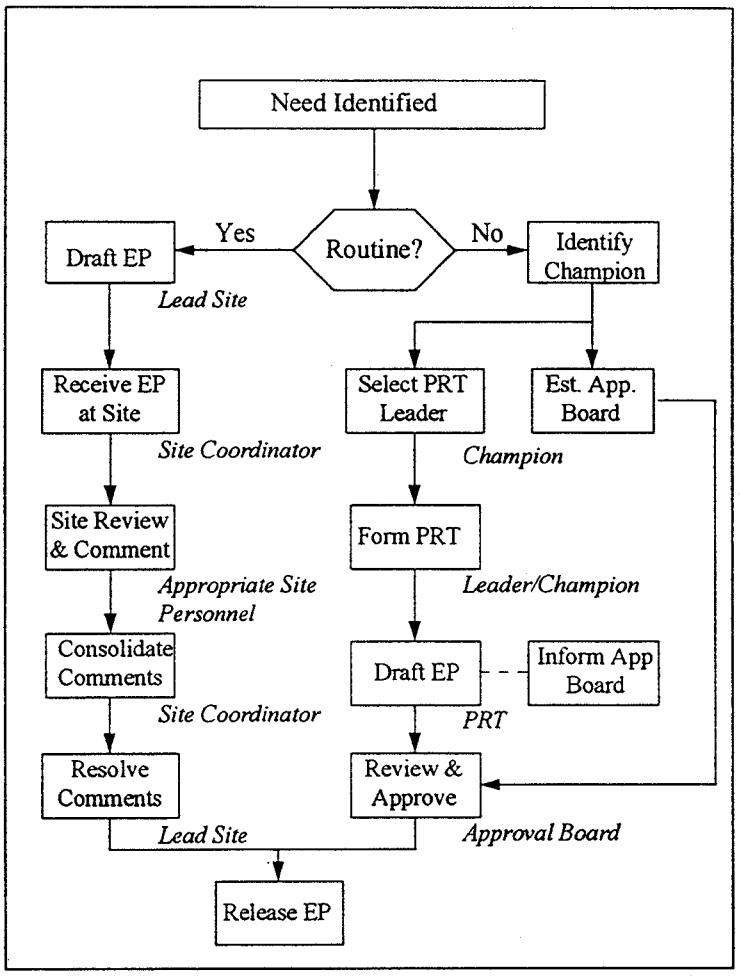

Figure 3. EP Approval Process

Issues

Lastly the team developed a list of issues that pertain to the EP Architecture project. These issues are as follows.

- DOE will continue to participate in the approval of Tier 1 and Tier 2 documents.
- $750k for this project should be shared among sites to ensure site participation.
- Improve networking communication to reduce travel.
- Throwing EPs over the wall to the sites is not concurrent engineering.
- Consideration needs to be given to the service center.
- Changes to the D& P Manual should be fed to sites for comments.
- Initial architecture was defined but no boundaries were established to define minimum set of requirements. This could lead to false starts by the PRT.
- The customer for this project is ill defined. Is it the Guidance Team or is the Architecture Committee going to reconvene to act as the customer?

Follow-up Status

The Architecture Subcommittee was asked to brief their output at the February Guidance Team meeting. A summary of this briefing and feedback of from the Guidance Team follows. In addition, the current status of the project is given.

The Architecture Subcommittee briefed their output to the Guidance Team at the February 29th meeting in Dearborn, Michigan. The EP Architecture described herein is believed to identify and define the condensed set of processes that should be controlled at the interagency level in order to drive change within the complex, facilitate implementation of concurrent engineering and qualification, and respond to change with speed and agility. It is believed that these products provide a potential work breakdown structure (WBS) and high level timeline for a project to develop and approve these EPs.

A suggestion was made to prioritize of the four Tier 1 and six Tier 2 documents based on the importance of the document in facilitating implementation of concurrent engineering throughout the NWC. The higher priority Tier 2 documents were believed to include 1) project management; 2) Qualification Systems/Methods; 3) Design Development; 4) Manufacturing Implementation 5) Engineering Authorization; and 6) Enterprise Integration. It was suggested that the Guidance Team consider this set as critical and associate an interim for rough draft of these within 3-6 months. It was also recommended that due to budget and time limitations an interagency PRT should not develop these drafts. Rather, SNL would assume leadership to draft these documents and solicit input and comment from other agencies and begin a thorough coordination process of drafts generated in this fashion.

Several issues were summarized briefly including funding constraints, concerns regarding throwing EPs over the wall, the impacts to the D & P manual and the service center concept for EP management.

The Architecture Team reported that they considered their work to be complete unless there was a need to meet with the key project personnel selected to develop the EPs. The technical leadership to develop the EPs was assigned to SNL Systems Engineering..

It was the consensus of the Guidance Team that the effort be focused on consolidation of existing EPs rather than on revolutionizing the engineering processes documented in EPs. This approach was believed to mitigate risk. Thus, most of the EP drafts would follow the "routine" route of the coordination process. Changes required to reconcile conflicts with EP401099 were considered to be within the routine scope. One exception was noted . A PRT was suggested to look at options for re-engineering Engineering Authorization to take advantage of electronic Enterprise Integration. Each Guidance Team member provided a member to this PRT from their engineering community. This PRT is expected to suggest an approach at the May Guidance Team meeting

The Architecture Subcommittee work and the members assigned to the Engineering Authorization PRT have been communicated to SNL System Engineering. The budget authorized for this work has also be transferred effective March 13, 1996. All follow-on progress and activity will be provided by the project lead, Corey Knapp.

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: Project Management	
Definition (25 words or less): The system the team uses to maintain adequate control of the product realization process in completion of their task.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: 019, 026, 061, 099, 302, 303, 304, 305, 530, 540, 542, 546, 567, 576, (073?)	
Beginning Activity: Team Assigned Task	Ending Activity: Team Completes Task
Includes: Project Plan, Metrics, Requirements Dev., WBS, Attributes, Program Control (cost/schedule), Test Plan, Qualification Plan, Mfg. Master Plan	Doesn't Include: Qualification system details (Product results)

Tier 2 Subject: Qualification Systems/Methods	
Definition (25 words or less): The specific details, where necessary, to qualify specific types of "Products" and "Processes."	
Tier 1 EP: Product Realization	
Existing Applicable EPs: 401015, 401105, 401563, 401401, 401408, 401412, 401100, 401413-401422, 401011, 401056, 401062, 401058, 401801	
Beginning Activity: Define "what" to qualify	Ending Activity: Qualification Complete
Includes: What to do, vendor qualification, M&TE qualification, Is "thing" capable of meeting requirements, Did "thing" produce as capable. Process Qualification, Re-qualification, Software Qualification, Product Qualification, QE/TMS/EE Material Qualification, Tester Qualification, Certified Tooling, Supplier Selection/Development/Qualification Software Quality Assurance	Doesn't Include: Exactly how to do it.

Tier 2 Subject: Design Development	
Definition (25 words or less): Preparation of design for initial prototype manufacturing. Development of producible designs.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: EP401099, 063, 052, 035, 518, 528, 536, 537, 544, 547, 576, 578, 579, 501	
Beginning Activity: Functional Requirements Analysis	Ending Activity: Stage II QER
Includes: Conceptual design development requirements development. Modeling & simulation prog. Risk assessment development prototyping	Doesn't Include:

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: Manufacturing Implementation	
Definition (25 words or less): Product development processes that integrate manufacturing producibility and qualification.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: EP401099, 026, 079, 018, 049, 019, 563	
Beginning Activity: Process Development	Ending Activity: Stage IV QER
Includes: Producibility Assessment, Tooling prove-in, Make/Buy decision, Vendor qualification, Material qualification, Process qualification, Product qualification, Pilot production, Rate production, Initial production unit.	Doesn't Include: All production

Tier 2 Subject: Dismantlement	
Definition (25 words or less): The process of planning for designing, building tooling, and performing operations to dismantle weapons.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: *401110, 401105, 561 High level guidance D&P ch. 3.7.?, QC-1	
Beginning Activity: Program Plan	Ending Activity: Sanitization or recycling of components
Includes: Plan, Tooling, design/fab., procedures, Evaluations (Nuclear Safety, HS&E, Risk Analysis, S.E.?.) FDUs Demils, Sanitize Stockpile Life	Doesn't Include: Pantex internal evaluations, training

* *Note: 110 becomes Tier 2 under safety*

Tier 2 Subject: Stockpile Evaluation	
Definition (25 words or less): The process to identify, design and qualify processes, disassemble weapons, perform tests, compile and analyze data, to assure stockpile integrity.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: 401010, - 016, , -020, -023, -025, -033, -034, -035, -040, -041, -043, -044, -050, -060, -061, -062, -068, -069, -074, -075, -078, -080, -081, -085, 049/104, -558, -051	
Beginning Activity: Estimate of NMSES Plan	Ending Activity: Reliability Evaluation Report
Includes: As above	Doesn't Include: Disposition or re-use of components

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: Weapons Repairs and Maintenance	
Definition (25 words or less): The process to design/fabricate tooling, prepare procedures, train and qualify personnel, perform repairs to weapons in the field and at PX, and conduct LLC exchanges and block upgrades.	
Tier 1 EP: Product Realization	
Existing Applicable EPs: 401010, 401020, -023, -050, -060, -021, -027, -513, -564, D&P Ch. 3.1, 3.2, 3.3	
Beginning Activity:	Ending Activity: Repaired Weapon
Includes: LLCs, Block Upgrades, Repairs	Doesn't Include:

Tier 2 Subject: Integrated Logistics Support	
Definition (25 words or less):	
Tier 1 EP: Product Realization	
Existing Applicable EPs: EP401512, EP401514	
Beginning Activity:	Ending Activity:
Includes: Planning for trainers, spare parts, Support Plan	Doesn't Include:

Tier 2 Subject: None, Tier 1 Subject Area	
Definition (25 words or less): Policy/Procedure place holder for nuclear safety.	
Tier 1 EP: Nuclear Weapon Safety	
Existing Applicable EPs: 5610.10, 5610.11, 075, 566, 568, 575, 569, 099, 105, 110, 538, 539, 548, 517, 531	
Beginning Activity: Planning stages for assembly, disassembly, and dismantlement	Ending Activity: Disassembly of NE
Includes: Needs to fleshed out into Tier 2 processes	Doesn't Include:

Tier 2 Subject: Integrated Safety Process	
Definition (25 words or less): Defines an integrated process to assure the safe assembly or disassembly of nuclear weapons.	
Tier 1 EP: Nuclear Weapon Safety	
Existing Applicable EPs: EP401110	
Beginning Activity: Requirements Generation	Ending Activity: SED, SEP, or SES
Includes:	Doesn't Include:

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: Identification & Control of Non-conforming Items	
Definition (25 words or less): Establish procedures for dispositioning product deviations.	
Tier 1 EP: Configuration Management	
Existing Applicable EPs: 401025, 401023, 010, 050, 060, 520	
Beginning Activity: Initiate methodology	Ending Activity: Seamless consistent approach
Includes: All deviation reports SXRs/SFIs/URs	Doesn't Include: Norms

Tier 2 Subject: Major Assembly Release	
Definition (25 words or less): Warranty that the product meets the requirements/design intent imposed by the military. Before full rate production.	
Tier 1 EP: Configuration Management	
Existing Applicable EPs: 401521	
Beginning Activity: Completion of Engineering Evaluation activities and release of certified drawing	Ending Activity: FPU delivery
Includes:	Doesn't Include: Phase 6 & 7 activities

Tier 2 Subject: Engineering Authorization	
Definition (25 words or less): Approval of design information for production and the resulting data management activities associated with production.	
Tier 1 EP: Configuration Management	
Existing Applicable EP's 015, 085, 311, 044, 099, 319, 032, 056, 522, 082	
Beginning Activity: AER/CER	Ending Activity: Dismantlement
Includes: Records retention, ROA, Release, PDM, QER, SXRs	Doesn't Include: Scheduling, funding

Note: This overlaps with Design Documentation

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: EP Management	
Definition (25 words or less): The review, coordination , and issuance of EP affecting product realization.	
Tier 1 EP: Configuration Management	
Existing Applicable EPs: 401001 - EP Coordination	
Beginning Activity: Identification of new subject.	Ending Activity: Release and implementation of new topic.
Includes: Existing EP maintenance, training, metrics, coordination, influence D&P manual, communication, barrier busting templates, maintain EP architecture, templates.	Doesn't Include: Training development resulting tier 3 documents or guidance documents

Configuation of Type System already exists.

Tier 2 Subject: Design Documentation	
Definition (25 words or less) The Drawing System defines the processes necessary to identify product design intent.	
Tier 1 EP: Configuration Management	
Existing Applicable EPs: 040, 528, 054, 032, 515, 553, 562, 014, 533, 033, 103, 034, 519, 016, 046, 101, 102, 048?, 051, 065, 084, 089, 516, 550, 404, 030, 045	
Beginning Activity: Assignment of drawing ID	Ending Activity: Revision of existing drawings
Includes: Change Control, Marking, Part numbering, Control drawings	Doesn't Include: d standards, Engineering releases, deviations

Note: This overlaps with Engineering Auth.

Tier 2 Subject: Definition/Acronyms	
Definition (25 words or less): Acronyms and definitions required to classify those employed in EPs	
Tier 1 EP: Enterprise Communication	
Existing Applicable EPs: None	
Beginning Activity: A	Ending Activity: Z
Includes: Definitions of terms used in other EPs Acronyms of terms used in other EPs	Doesn't Include: Definition or acronyms used outside EPs

Attachment 1 - Tier 2 Subject Area Definitions

Definition Sheets

Tier 2 Subject: Enterprise Integration	
Definition (25 words or less): Establishing connections, capturing legacy information from and employing common business practices across NWC locations.	
Tier 1 EP: Enterprise Communications	
Existing Applicable EPs: EP401319	
Beginning Activity: "Dirt Road" Connectivity	Ending Activity: Extended Enterprise Super Highway
Includes: PRT Historical File, Lessons Learned, Technical Publications, EIS, TIE, EDI, Coordination with PDM	Doesn't Include: Paper system, traditional business practices, EP401017

Tier 2 Subject: DOE Weapons Program Phases	
Definition (25 words or less): Describes the DOE seven phase system and DoD interfaces	
Tier 1 EP: Enterprise Communication	
Existing Applicable EPs: EP401523	
Beginning Activity: Phase 0	Ending Activity: Phase 7
Includes: Current EP (probably as is)	Doesn't Include: Anything else

Attachment 2- Recommended Disposition of Current EPs

		Tier 2 Subject Areas																						
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement	Stockpile Evaluation	Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401000	Numerical Index Interagency																					
EP401001	Engineering Procedures System														x							
EP401010	Reporting Deficiencies in Hardware						x	x				x										
EP401011	Qualification Evaluation System		x																			
EP401013	Interagency Control of Commercial Supplier's Documents																					
EP401014	Seven-Digit Material and Process Specifications																x					
EP401015	Engineering Procedure, Quality Evidence and Records Retention		x											x								
EP401016	Weapon Identification System and Marking Criteria						x										x					
EP401017	Preparation and Use of 35mm Microfilm Aperture Cards																				x	
EP401018	Procurement Classes of Weapon Product				x																	
EP401019	Technology Demonstration Definition Document (TDDD)	x			x																	
EP401020	Weapon Records Cards						x	x														
EP401021	Tritium Reservoir Kit Def. (AL-SX)							x														
EP401023	Reporting of Defective Material Returned From Stockpile						x	x				x										
EP401025	Specification Exception Control System						x					x										
EP401026	Pilot Production	x			x																	
EP401027	Limited Life Component Kit Definition							x														
EP401030	Printed Wiring Boards																x					
EP401032	Product Change Control													x			x					
EP401033	Revising Drawings and Part Numbers to Define Product Changes						x										x					
EP401034	Engineering Change Documentation						x										x					
EP401035	Sandia and Production Agency Acceptance Equipment Interfaces			x			x															
EP401040	Drawing System						x										x					
EP401041	Design Definition for Reprocessing & Reworking Weapon Product						x															
EP401043	Acceptance Equipment Program Definition						x															
EP401044	Engineering Release System						x							x								
EP401045	Definition of Computer Software Configuration Items																x					
EP401046	Procurement Definition System																x					
EP401048	Limited Production System																x				x	
EP401049	Pantex-Sandia Interface for O&I Standards				x		x															
EP401050	Disposition of Discrepant DoD Material						x	x				x										
EP401051	Lab Test Program Configuration Definition						x										x					
EP401052	Design Delegation			x																		
EP401054	Nine-Digit Part Number System																x					
EP401055	Computer Aided Design System (CADS)																				x	

Attachment 2- Recommended Disposition of Current EPs

		Tier 2 Subject Areas																							
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement	Stockpile Evaluation	Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401056	LL/Control and Certification		x											x								
EP401058	Conformity Verification by Tool Control		x																			
EP401060	Examination and Repair of DoD-Returned Weapon Assemblies at Pantex						x	x				x										
EP401061	Definition Control for the W78 Program	x					x															x
EP401062	Laboratory Test Program Validation		x				x															
EP401063	Design Reviews			x																		
EP401064	JTA HMC Prod. Sys ???																					
EP401065	Design Control of Raw Materials																x					
EP401067	Procedures for Integrated Contractor Orders on Sandia																					
EP401068	Sealant and Adhesive Shelf Life						x															
EP401069	JTA/2F Telemetry Procedures at Pantex						x															
EP401071	Large Scale Integrated (LSI) Circuit Definition System																				x	
EP401072	Process Engineering Support																				x	
EP401073	Configuration of Type Weapons	x																				
EP401074	Telemetry Simulator Units						x															
EP401075	Electrical Testers for Use With Nuclear Explosives at DOE Facilities						x			x												
EP401078	Technical Information Exchange (TIE)						x															
EP401079	Designation of Design and Manufacturing Requirements				x																	
EP401080	New Material & Stockpile Systems Evaluation						x															
EP401081	Engineering Evaluation System (EE)						x															
EP401082	LL/KC Dwgs & Procedures System													x								
EP401083	LL/MD Drawing & Procedure System																					
EP401084	LL/RF Drawing System																x					
EP401085	Record of Assembly (ROA) System						x							x								
EP401087	SL/RF Drawing System																					
EP401089	LL/OR Drawing System																x					
EP401099	Product Realization Process	x		x	x					x				x								
EP401100	Qualification of Processes and Products Under Demonstration Programs		x																			
EP401101	Defining Commercial Product in the Engineering Drawing System																x					
EP401102	Use of Public Domain Definition																x					
EP401103	Drawing, Part, and Control Numbers for Development Product																x					
EP401105	Qualification Evaluation for Dismantlement (QED) (SED) Being revised		x			x				x												
EP401110	Integrated Safety Process for Assembly and Disassembly of Nuclear Weapons					x				x	x											
EP401200	Numerical Index of Active Development Contractor Engineering Procedures																					x

Attachment 2- Recommended Disposition of Current EPs

		Tier 2 Subject Areas																					
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement Stockpile Evaluation		Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401201	Acquiring Contractor Documents Under A Development Contract																					x
EP401202	Test Proposals																					x
EP401203	Test Equipment Engineering Reports																					x
EP401205	Design Prove-in and Tester Checkout																					x
EP401207	Control Of Design Prototypes Under A Commercial Development Contract																					x
EP401208	Tester Accuracy Study																					x
EP401212	Preparation of 35 mm Microfilm Aperture Cards																					x
EP401213	Maintenance Acceptance Equipment Drawings																					x
EP401215	Development Definition Control																					x
EP401216	Definition Control for Nuclear Burst Detection System (NBDS)																					x
EP401217	Definition Control for Venus Orbiter Gamma Burst Detector (OGBD)																					x
EP401219	Definition Control for Plutonium Air Transportable (PAT) Package																					x
EP401221	Definition Control for Plutonium Air Transportable Package, Model 2 (PAT-2)																					x
EP401222	Definition Control for Laser Simulator Applications (LSA)																					x
EP401223	Examination Facility (FMEF) Security System																					x
EP401224	Engineering Procedure, Definition and Change Control System for PBFA II, Marx Generator																					x
EP401225	SR Plant Safeguards Upgrade System																					x
EP401229	Technical Water PROC. SYS																					x
EP401232	Definition Control for Underground Nuclear Test of Arming and Firing Components																					x
EP401300	Numerical Index of Computer Integrated Manufacturing (CIM) Engineering Procedure																					
EP401302	Management of CIM Projects	x																				
EP401303	Management Plan for Development of CIM Software	x																				
EP401304	CIM Configuration Management Plans	x																				
EP401305	CIM Effectivity Plans	x																				
EP401311	Design Concepts for NWC Drawings and CAD/CAM Compatibility													x								
EP401314	File Header, Version 3																				x	
EP401316	DOE NWC File Header, Version 4																				x	
EP401319	Text and Graphics Data Exchange of Product Data													x					x			

Attachment 2- Recommended Disposition of Current EPs

		Tier 2 Subject Areas																								
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement	Stockpile Evaluation	Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401400	Numerical Index of Active Procurement Engineering Procedures																					
EP401401	Qualification Evaluation System for Commercial Contractors		x																			
EP401402	Controlled Documents and Coordinated Documents																					
EP401404	Interpretation of Procurement Index																x					x
EP401408	Inspection Program Requirements		x																			
EP401410	Use of Sandia Engineering Change Orders by Suppliers																					
EP401412	Calibration of Contractor's Standards		x																			
EP401413	Sandia Source Acceptance		x																			
EP401417	Component Testing and Quality Evidence		x																			
EP401418	Quality Program Requirements		x																			
EP401419	Certification for Raw Materials		x																			
EP401420	Certification for Standard Parts		x																			
EP401422	Quality Program Requirements for Contractor-Furnished Software		x																			
EP401500	Numerical Index of Design Agency Engineering Procedures																					
EP401501	Design and Manufacturing Guide			x																		
EP401502	Procedure for Control of Environment, Safety and Health (ES&H) Documents																					x
EP401512	DOE-DNA TP Manuals & Source Data for Military Manuals								x													
EP401513	Retrofit Activities							x														
EP401514	DOE-DoD Eval. New Weapon Systems and Related Military Manuals and Source Data								x													
EP401515	Product Change Proposal (PCP)																x					
EP401516	Command and Control Software Definition System																x					
EP401517	Explosive Ordnance Disposal Activities									x												
EP401518	Component Engineering Reports			x																		
EP401519	Production Waiver																x					
EP401520	Disposition of Specification Exception Material (SEM) for Commercial Suppliers											x										x
EP401521	Major Assembly Release System												x									
EP401522	Hold Order													x								
EP401523	DOE Weapon Program Phases																			x		
EP401525	Weapon Project Officers																					x
EP401528	Interface Definition and Control/Component Request			x													x					
EP401529	Public Release of Drawings																					x
EP401530	Weapon Programming	x																				
EP401531	Control of Hazardous Components																					
EP401532	Engineering Data File System																					x

Attachment 2- Recommended Disposition of Current EPs

		Tier 2 Subject Areas																						
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement	Stockpile Evaluation	Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401533	Drawing Numbers																x					
EP401535	Weapon Material Returned to Sandia for Examination																					x
EP401536	Weapon Development Reports			x																		
EP401537	Requirements for Joint Test Assemblies			x																		
EP401538	Nuclear Explosive Safety/Survey (NESS) Program									x												
EP401539	Nuclear Safety Throughout all Weapon Phases									x												
EP401540	Spare Parts	x																				
EP401541	Electrostatic Sensitivity																					x
EP401542	Military Characteristics and Stockpile-to-Target Sequence	x																				
EP401543	Development Schedule, Budget and Manpower Requirements																				x	
EP401544	Weapon Development Testing			x																		
EP401546	Sandia - Los Alamos Interface Mockup (SLIM)	x																				
EP401547	Development and Production Test Data			x																		
EP401548	Nuclear Weapon System Safety Group (NWSSG)									x												
EP401549	Engineering Sketches																				x	
EP401550	Drawing Archive and Inactivation																x					
EP401551	Requests for Design Definition Service																				x	
EP401553	Release of Engineering Prepared Drawings When Originals are a Tape or Disk																x					x
EP401554	Procurement Schedule																				x	
EP401555	Stop Production Notice																					
EP401556	Inspection of Development & Production Material																				x	
EP401557	Sandia Equipment																					x
EP401558	System Test Equipment						x															
EP401560	Calibration Program																					x
EP401561	Weapon Retirement					x																
EP401562	Identification Marking of Non Weapons Material																x					
EP401563	Quality Evaluation of Commercial Contractors		x		x																	
EP401564	Special Repair Procedures for Weapons in DoD Custody							x														
EP401565	Electromagnetic Environmental Testing & Analysis																				x	
EP401566	Control of Nuclear Explosive Like Assemblies									x												
EP401567	Handling and Field Test Equipment	x																				
EP401568	Nuclear Safety Requirements for Underground Nuclear Tests									x												
EP401569	Non-Nuclear Assurance Program (NNAP)									x												
EP401571	Control of Drawings at SNL-CALIF.																					x
EP401575	Requirements for Nuclear Explosive - Like Assemblies (NELA) at Pantex									x												
EP401576	Development Program Coordination	x		x																		

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		Tier 2 Subject Areas																						
Current EPs	Title	Project Management	Qualification Systems/ Methods	Design/ Development	Manufacturing Implementation	Dismantlement	Stockpile Evaluation	Weapon Repair & Maintenance	Integrated Logistics Support	Nuclear Weapon Safety (Tier 1)	Integrated Safety Process	Id/Control of Non-Conf Items	Major Assembly Release	Engineering Authorization	EP Management	Configuration of Type System	Design Documentation	Definitions & Acronyms	Enterprise Integration	DOE Weapons Program Phases	Delete	Tier 3
EP401577	Acquiring Contractor Documents to Define Product																					
EP401578	Weapon Prephase 3 Development Activities			x																		
EP401579	Development Documentation			x																		

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